

## Forest Land Encroachment in Kehmil Forest Division of Kupwara District: Dimensions, Causes and Consequences.

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### Abstract

This research aims to identify the areas under encroachment and its causes and consequences in the Kehmil forest division of the district of Kupwarain Jammu and Kashmir. The survey was conducted for two consecutive years during September 2020 to November 2020 and September 2021 to November 2021. The study area is dominated by (*Himalayan dry-temperate to subalpine forest types*). *Cedrus deodar*, *Pinusexcelsa*, and *Abiespindroware* the species in the Kupwara region with the highest importance value (IV). For data collection, direct observations of the encroached site, interviews and opinion of the locals, literature studies and analysis were done. The study area of 546.89 hectare land was encroached by 2178 encroachers. It was determined that the encroached area's agricultural system is a dry land one with horticultural crops as its primary plant types. The main reason for forest encroachment by the population is relatively huge such as rise in population and unemployment, restrictions on agricultural land and forest guard forces. Due to forest encroachment, the abolition of forest plant species in study area has altered the expected ranking of tree species identified in the undisturbed forest. Based on the present study, it is concluded that there is a need of extensive land-use regulations at the national and municipal levels to stop future deforestation by well-built protections for the remaining forest land in the Kehmil forest division.



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### Introduction


The survival of forests, which are essential habitats on the earth's surface, allows for the preservation of the variety of flora and fauna. Forests now continuously turned into agricultural and settlement

areas. These varied forests are complex habitats made up of both plants and animals. Within a predetermined set of environmental circumstances the ordinary changes has experienced to most species within these habitats. The rural communities

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extract timber and firewood adjacent to the forest, obtain construction materials, get medicinal plants, collect honey and also graze their livestock in the forest. Generally humans engage in incursion by using forest land for cultivation of crop plants by eliminating forest products like unlawfully utilised timber or non-timber that is not authorised by the government.<sup>1</sup> The forest invasion is caused by a number of things such as forest area under easy accessibility, poverty, under privileged education level, unemployment and shortage of staff to check the area and fertility of the soil. The forest degradation has already resulted to a reduction of wildlife habitat and pastoralist livelihoods downstream. Studying land use and land cover change is now essential to understanding how humans and the environment interact.<sup>2-4</sup> Disaster reduction (DDR) and climate change adaptation strategies are similar to those of reducing land use and land cover change (LULCC).<sup>5,6</sup> Variations in land use and land cover are related to changes in surface temperature and precipitation.<sup>7</sup> In Kupwara region the changes in land use and land cover results as a consequence of rise in population, financial growth and changes in many other environmental and social activities.<sup>8</sup> India with its great topography and climatic diversity has a very rich and diverse flora and fauna.<sup>9</sup> With the increasing biotic pressure the forests and alpine are getting degraded with the increasing biotic pressure and in the process ground flora and shrubs which happen to deliver bulk of the medicinal plants are also under stress.<sup>10</sup> Various anthropogenic

activities in Kashmir Himalaya including overgrazing, deforestation, rigorous farming, and upsurge in globalization.<sup>11</sup> The tree species with high density in the study area are *Abies pindrow*, *Pinus wallichiana* and *Cedrus deodara* while as in case of shrubs the dominant species are *Parrotiopsis jacquemontiana*, *Viburnum grandiflorum* and *Berberis lyceum*; in case of herbs species such as *Poa spp.*, *Fragaria nubicola*, *Seneciochry santhemoides*, *Ranunculus laetus*, *Artemisia absinthium* and *Sambucus wightiana* are dominant.<sup>12</sup> It also observed that due to population explosion, the loss of vegetation is causing land habitats to be used for agriculture at a very rapid rate.<sup>13</sup>

## Materials and Method

### Study Area

District Kupwara's Kehmil Forest Division is situated at 34.5262° N and 74.2546° E in northern Jammu & Kashmir (Fig 1). Kupwara is regarded as the Kashmir valley's least developed border region. The district is noteworthy for its favourable climate, tourism, and wildlife because it is surrounded by steep mountains and predominantly dense and moderately dense forest areas. Kupwara experiences warm and temperate climate and having pleasant weather from April to October. Snowfall is limited between Decembers to April with insufficient rainfall. The annual average temperature recorded is 14.10°C and average rainfall is 843 mm.<sup>14</sup> The area is biodiversity rich, with dense forests (Himalayan dry-temperate to subalpine forest types)<sup>11</sup>

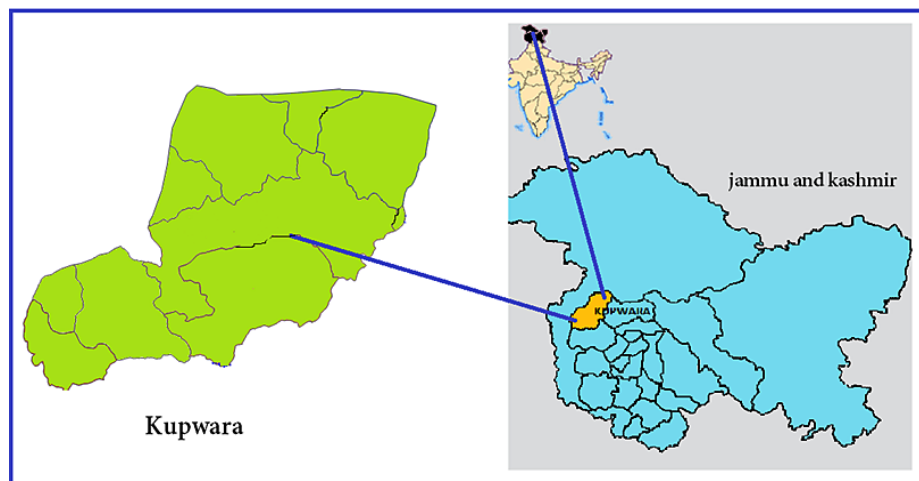


Fig. 1: Study area map

**Data Collection**

The Kehmil forest division of district Kupwara was divided into four ranges; Rahmal, Nahhari, Keran and Karnah with 62472 Hectare of land. The sampling was grouped into two main portions; such as

- (a) The area for sample for research and
- (b) The population for sample.

34 beats of the study area, 13 beats that were sampled in this research which were surveyed at two different time periods. The purpose of this sampling depends the following

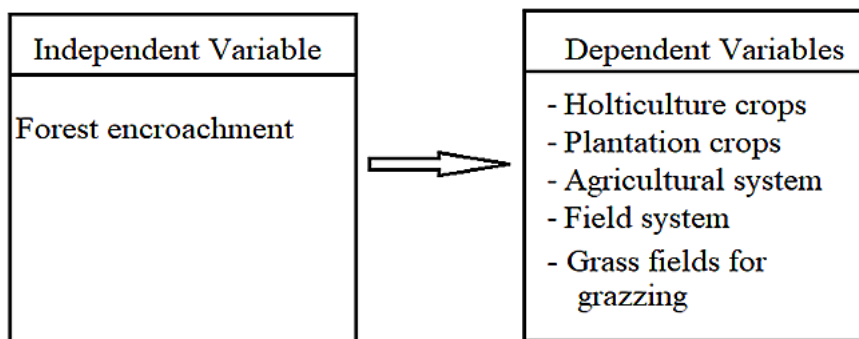
- (a) The part is integrated in Kehmil forest division,
- (b) the region that interacts on a social and economic level with the forest
- (c) The sample part is very close to the forest and
- (d) The region is part of an area where the forest has encroached.

Moreover, the data necessary for this research has also been collected through interviews of the local

community, on site observations and available literature and documentation.

**The First survey**

It was conducted during September 2020 to November 2020. FSI's (Forest Survey of India) land-use and land-cover map from 2019 served as the foundation for the test dataset surveyas a reference and material object, also during the field work, GPS (Global Positioning System) was used to find out the different positions. Additionally, to record the field work a digital camera was also used. This first beat survey in which six beats were selected was done to identify the types of incursion occurred and the way people intrude into forest for their living.The individual participatory rural assessment recognized the key living activities of inhabitants under six specific beat as (a) maize farming, (b) grazing, (c) paddy cultivation and (d) cutting wood for fuel and construction (Fig.2.)



**Fig.2: Research variables**

**The Second Survey**

It was conducted between September 2021 and November 2021. This research involved seven beats. Interviews were conducted with the forest department employees of Kehmil forest division based on questionnaires addressing vegetation classification and disturbances. To gather data from those who relied on the forest for their survival, questionnaires were used. A random sample of 5–40 houses was chosen for each beat. Interviews with the heads of the sampled population were conducted based on a questionnaire that covered the principal

economic activities. Cropland areas close to forested areas and cropland around the sample households' villages, socio - economic status, and the agrarian calendar were also largely used.

**Data Acquisition and Analysis**

With pre-formulated questionnaire, respondents were interviewed. Through a reconnaissance survey pre-testing was done with questionnaire. For analysis MS EXCEL, SSPL win version 10 has been broadly used.

**Table 1: No of beats with encroachment area in hectare, encroachment cases, and status of encroached land**

S.No	Beat name	Encroached area in hectare	No. Of cases	Status of Encroached land
1	Awoora	47.8	96	The maize cultivation, walnut plantation, paddy cultivation and grass cultivation
2	Amroie	4.5	48	
3	Budnambal	29.08	133	
4	Dardpora	29.75	99	
5	Dari	6.62	55	
6	Doodwani	5.85	63	
7	Drangyari	36.36	178	
8	Farkin	13	97	
9	Gabra	11.78	43	
10	Gugloosa	0.65	9	
11	Gulgam	9.85	89	
12	Gushie	19.35	77	
13	Hafrada	29.4	96	
14	Jada	12.05	58	
15	Jumangand	5.95	27	
16	Kachama	27.01	47	
17	Kadama	4.65	24	
18	Keran	4.8	26	
19	Khanbal	50.09	140	
20	Kralpora	31.07	48	
21	Kranu	8.9	38	
22	Kulsari	2.75	17	
23	Laderwan	9	43	
24	Malikpora	26.95	113	
25	Manzgam	26.01	87	
26	Panzgam	15.6	56	
27	Punzwa	20.18	67	
28	Rashanpora	0.75	10	
29	Reddi	13.45	30	
30	Sulaiman	18.13	64	
31	Teetwal	1.65	23	
32	Trehgam	4	54	
33	Zoonareshi	12.6	76	
34	Zurhama	7.31	49	
	<b>Total</b>	<b>546.89</b>	<b>2180</b>	

## Result and Discussion

### Area of Encroachment and Attributes of Forest Occupants

Renovating forest services into agriculture, horticulture, or habitations is known as "forest intrusion."<sup>1</sup> The main reason behind the forest encroachment by the population were; (a) Rise in population and unemployment, (b) Limitation

of agricultural land and (c) Limitation of forest guards. The number of forest encroachers of area under study was 2178. The data were taken from 34 beats (Table 1). 1381 intruder, on average, have land areas smaller than a hectare which suggest that, to fulfill their needs, most of encroachers in area under study were dependent on agricultural product. Most of the encroachers were in the productive age

range, which is defined as being between 18 and 64 years old, but some others were classified as being in the quasi age range, or being older than 64 years old. One of the major contributing causes to encroachment was education level or productive awareness of the area of research. Along with other divisions of district Kupwara, deforestation is a major environmental issue. Over the course of the 21<sup>st</sup> century, according to GFW (Global Forest Watch), the forest cover of the country has been dropped. The recent high population growth and diverse human activities in the Himalayan temperate zone have resulted in a number of environmental issues. The largest driver of tree cover loss in India since

2000 is logging. In the study area, total number of beat surveyed at different time periods were 34 and the total encroached was 546.89 hectares by 2178 encroachers (Table 1). The majority of plantations inhabited on encroached land areas were (a) maize cultivation, (b) walnut plantation, (c) paddy cultivation, and (d) grass cultivation. As they have few options for a living, the nomadic people who dwell in the pine forests nearby at high altitude rely largely on pine tree species for fuel wood, lumber, and leaf litter. The new settler, for their settlement, take down the trees and it is huge where livestock shepherded already occupied the area.<sup>15</sup>



### Fencing around encroached forest area

**Fig 3: Encroached forest area fenced by encroachers**

#### **Changes in the Extent of Forest Vegetation**

There were mostly five types of forest in Kupwara district and among them, sub alpine and alpine forest types are dominant throughout the forest specifically in Kehmil forest division which was protected from degradation. Southwest Kehmil division forest blocks had the most variety of vegetation, dominated forest mixture and grassland indicating a long history

of encroachment (Fig.3). This degraded part of the forest comprised the area set aside for settlement. There was little encroachment on the western side of the forests in the Kehmil forest division. Due to forest encroachment, the expected ranking of tree species identified in the undisturbed forest was altered. The abolition of species for encroachment in study area were *Abiespindrow*,

*Cedrus deodara*, *Pinus wallichiana*, *Picea smithiana*, *Picea morinda*, *Robinia pseudoacacia*. The record from forest department and on ground survey suggests the clearness of forest cover for agricultural purposes. In order to clear the other species inside the encroached forest are aware herb species like *Fragaria nubicola*, *Lacaita*, *Sibbaldia cuneata*, and Shrub like *Parrotiopsis jacquemontiana*, *Rehder*, *Viburnum grandiflorum*, *Indigofera heterantha*. Assumed the interplay among vegetation, climate, anthropogenic impacts, offensive species, and troubled management, a stable structure of vegetation cannot be guaranteed.<sup>16</sup> The determination of reliable reference conditions is a fundamental problem in ecological restoration,<sup>17,18</sup> and any restoration strategy must take into account the numerous dangers involved with such large-scale change. Besides this it is observed that at the expense of forest cover the farmland is increasing, therefore, through alternate refined sources, the trend can be checked. A periodical assessment of the forest cover should be done as well as the locals should be engaged with the education of environment and forest so that they could be aware and learn about the changes in forest and its subsequent effects on nature and their lives.<sup>13</sup>

### Strategy and the Framework of Law

#### Legal Compliance

The new law of forest<sup>19</sup> has clear policies concerning forest excisions that should protect the forests from future excisions and nullify the proposed excisions. Measures should then be taken to reduce any further decrease in the forest land and to initiate proper management plans that will enhance the capacity of the forest to sustain its functions. Although the law prohibits illicit practices in reserved forests, it has been effectively undermined by rising poverty, increased economic activity, and a lack of enforcement there, leading to the continuation of unapproved tree cutting and encroachment for farmland, grassland, and establishment projects. As per the forest law, inside the reserved forest, agricultural engagement activities constitute a violation of the law. Agriculture land expansion committees advocate for the transition of forest land, including forests, into farmland at the national, regional, district, and township levels. Regional authorities give priority to farmers, particularly who live around forest area. To the existing farmers

it became accessible to do encroachment more land year by year. The government has not prioritized the conservation of the forest land and forest species, especially compared to its emphasis on agriculture owing to dearth of consciousness about the worth of forest diversity, forest resources, forest communities, forest factors for regulation of climate.

#### Conclusion

The encroachment area turned into agricultural system of Kehmil forest division was a continuous process from last ten years. Economic and cultural aspects are the encroacher taken into account while establishing the evolved horticulture and farming methods. Due to forest land encroachment, the abolition of forest plant species in study area has altered the expected ranking of tree species identified in the undisturbed forest. This research has contributed to the explanation of the vegetation composition close to the Kehmil Forest Division's encroached forest area and may be used to direct restoration efforts and planning stages for natural ecosystem. Plant types that were planted under encroached area of study were dominated with crops of horticultural and agricultural importance such as *Zea mays*, *capsicum*, *Solanum lycopersicum*, *Solanum toberosum* and *Allium cepa*. Other plantation crops are the trees with high value such as *Juglans regia*, *Papulus alba* and *Salix alba*. The rate of forest encroachment is unstoppable since there is a lack of understanding regarding the significance of forest resources. To stop additional deforestation in the Kehmil Forest Division, comprehensive national and municipal land-use policies are urgently required, as well as a well-built conservation for the surviving natural forests.

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#### Conflict of Interest

There is no conflict of interest

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